



# The need of systematic nodal dissection for the future staging and decision making

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The classification of malignant tumor is based on the anatomical extent of disease assessed with three categories: T categories—the extent of primary tumor, N categories—the absence or presence and extent of regional lymph nodal metastasis, and M categories—the absence or presence of distant metastasis. Nodal involvement is a strong predictor of survival. The N category for lung cancer has been described in the location of involved lymph nodes. The regional lymph nodes for carcinoma of the lung are the intrathoracic nodes including mediastinal, hilar, lobar, interlobar, segmental, and subsegmental nodes, scalene nodes, and supraclavicular nodes. The UICC and AJCC accepted the lymph node map and anatomical definitions for each lymph node station proposed by the International Association for the Study of Lung Cancer (IASLC). In the 8th edition of the TNM classification for lung cancer, N category is classified according to the location of the metastatic lymph nodes as N0: no regional node metastasis, N1: metastasis in ipsilateral peribronchial and/or ipsilateral hilar nodes and intrapulmonary nodes, N2: metastasis in ipsilateral mediastinal and/or subcarinal nodes, or N3: metastasis in contralateral mediastinal, contralateral hilar, scalene, or supraclavicular nodes (1,2). This categorization is based on the lymphatic stream from the lung parenchyma through lobar, interlobar, hilar, and mediastinal nodes, and to supraclavicular nodes.

Dr. Kostoulas and Dr. Papagiannopoulos described detailed procedure of complete lymph node dissection for each station of mediastinal nodes via thoracotomy in this issue (3). According to the TNM rules for pathological

classification, in any case, at least six hilar and mediastinal lymph nodes/stations should be removed or sampled, including three from N1 hilar-intrapulmonary nodes/stations and three from N2 nodes/stations including subcarinal nodes. The IASLC recommends performing a systematic nodal dissection or a lobe-specific systematic nodal dissection for the proper pathological lymph node staging and to fulfill the requirements for complete resection and pathological N0 (4). Systematic nodal dissection is an *en-bloc* removal of the mediastinal fatty tissue, including the lymph nodes, which should be followed by hilar and intrapulmonary nodal dissection. Lobe-specific systematic nodal dissection consists of the removal of certain mediastinal lymph nodes, depending on the lobar location of the primary tumor. The mediastinal nodal stations that should be removed, according to the location of the primary tumor, are as follows: right upper and middle lobes: #7, #2R, and #4R, right lower lobe: #7, #4R, and #8 or #9, Left upper lobe: #7, #5, and #6, and Left lower lobe: #7, #8, and #9. Dr. Kostoulas and Dr. Papagiannopoulos emphasized that the surgeon should follow the landmarks surrounding the nodes in each nodal station. The dissection should follow natural reflections and the soft flat structures.

It the recent analysis suggested that quantification of nodal disease based on the number of involved lymph nodes has the most prognostic impact in many organs. The number of involved lymph nodes is already used for N category in another thoracic tumor, esophageal cancer. Nodal categorization for esophageal cancer is already based on number of involved nodes: N0, no regional lymph

nodal metastasis; N1, metastasis in 1 to 2 regional lymph nodes; N2, metastasis in 3 to 6 regional lymph nodes; N3, metastasis in 7 or more regional lymph nodes. In the recent analysis performed for the 8th edition of the TNM classification of lung cancer, the prognostic impact of the number of involved lymph node stations was explored (5). According to the number of involved lymph node stations (single-station versus multiple-station), N categories were further subclassified: N1a: single-station N1, N1b: multiple-station N1, N2a1: single-station N2 without N1 (skip metastasis), N2a2: single-station N2 with N1, and N2b: multiple-station N2. The differences between single-station N1 and multiple-station N1, and between single-station N2 and multiple-station N2 were statistically significant. Single-station N1 has the best prognosis; multiple-station N1 follows, single-station N2 without N1 disease overlapped with no difference in survival; single-station N2 with N1 disease follows; and multiple-station N2. Therefore, Staging and Prognostic Factors Committee of IASLC recommend that physicians record the number of metastatic lymph nodes (or stations) and to further classify the N category using new subclassification, such as N1a, N1b, N2a, N2b, and N3, for prospective registration of clinical and pathological data.

For collecting the exact number of involved lymph nodes at pathological staging, meticulous evaluation of nodal involvement at the hilar and mediastinal stations, termed systematic nodal dissection is required. Systematic nodal dissection can disclose additional patients who are found to have lymph node metastases that were missed at systematic sampling. Since systematic nodal dissection can reveal unexpected mediastinal disease. Moreover systematic nodal dissection can reveal exact number of involved nodes, multiple-station involved nodes, and skip metastasis in mediastinal disease without hilar involvement. These facts support the importance of systematic nodal dissection at the mediastinal and hilar stations during lung cancer surgery. The accurate identification of node involvement by systematic nodal dissection is important for selection of the multimodal therapy in the present era. The counting the exact number of metastatic lymph nodes is difficult in not only pathological but also clinical staging for lung cancer, but it is already required for esophageal cancer. The need for collecting the detailed data for future staging in lung cancer should be addressed.

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